



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/527,943

03/24/2006

Jurgen Rabe

17346-0015

2410

29052

7590

01/21/2009

SUTHERLAND ASBILL & BRENNAN LLP  
999 PEACHTREE STREET, N.E.  
ATLANTA, GA 30309

EXAMINER

BASS, DIRK R

ART UNIT

PAPER NUMBER

4132

MAIL DATE

DELIVERY MODE

01/21/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/527,943	<b>Applicant(s)</b> RABE ET AL.	
	<b>Examiner</b> DIRK BASS	<b>Art Unit</b> 4132	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.  
     4a) Of the above claim(s) 24-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>Aug. 29, 2005, Dec. 19, 2005</u> .                            | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372. This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

2. In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-23, drawn to a method for arranging a polymer molecule.

Group II, claim(s) 24, drawn to a product.

Group III, claim(s) 25-27, drawn to a use of a method or product.

3. The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature, i.e. manipulating biomolecules on a substrate into alternate conformations, is taught by Bensimon et al., US 5840862. Bensimon ('862) discloses a method wherein macromolecules are 'stretched' on a support for subsequent assaying or measuring techniques (see abstract). In light of Bensimon ('862), the groups of inventions listed above do not provide a contribution over the prior art, thereby establishing a lack of unity between groups I-III.

4. During a telephone conversation with Peter Pappas on January 12, 2009 a provisional election was made with traverse to prosecute the invention of group I, claims

Art Unit: 4132

1-23. Affirmation of this election must be made by applicant in replying to this Office action. Claims 24-27 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-23 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Bensimon et al., US 5840862.

Art Unit: 4132

8. Regarding claim 1, Bensimon ('862) discloses a method for arranging a polymer molecule such as a biomolecule on a support (see abstract), the method comprising the following steps:

- a. Providing a substrate having a surface (see "support", col. 1, l. 48-54 and col. 3, l. 5-7);
- b. Providing a surface layer on said surface of the substrate, said substrate and said surface layer providing a support (col. 3, l. 8-12);
- c. Placing a polymer molecule on said surface layer in a first position (col. 3, l. 24-26); and
- d. Adsorbing the polymer molecule on said surface layer providing an adsorbed state of the polymer molecule, the polymer molecule having a first conformation on said surface layer (col. 3, l. 46-50); wherein said surface layer is configured to adjust predefined molecular interaction between the polymer molecule and said support to allow fixing of the first conformation of said polymer molecule (col. 3, l. 54-61), and in said adsorbed state of the polymer molecule dislocating at least part of the polymer molecule across said surface layer relative to said support by an external force (see "meniscus" col. 4, l. 6-7 and fig. 6).

9. Regarding claim 2, Bensimon ('862) discloses a method, wherein the method comprises a step for subsequently fixing the polymer molecule on the surface layer (col. 4, l. 8-10).

10. Regarding claim 3, Bensimon ('862) discloses a method, wherein the method comprises a step of dislocating in said adsorbed state the polymer molecule across said

Art Unit: 4132

surface layer by manipulation of said first conformation of the polymer molecule to a second conformation different from the first conformation of the polymer molecule (col. 2, l. 21-24 and fig. 6), and fixing the polymer molecule on the surface layer in said second conformation by means of said molecular interaction between the polymer molecule and said support (col. 3, l. 54 – col. 4, l. 10).

11. Regarding claim 4, Bensimon ('862) discloses a method, wherein the method comprises steps of dislocating the polymer molecule in said adsorbed state across said surface layer by changing said first position of the polymer molecule to a second position different from the first position on the surface layer (col. 2, l. 21-24 and fig. 6), and fixing the polymer molecule on said surface in said second position by means of said predefined molecular interaction between the polymer molecule and said support (col. 3, l. 54—col. 4, l. 10).

12. Regarding claim 5, Bensimon ('862) discloses a method, the method further comprising a step of configuring said surface layer to provide a force required for dislocating the polymer molecule across said surface layer (col. 3, l. 54 – col. 4, l. 10). It is inherent that the force is smaller than about 2 nN due to the fact that the surface layer and substrate claimed (claims 19-21) are the same as those disclosed in Bensimon ('862) (see rejections of claims 19-21 below) and that the same materials inherently possess the same properties.

13. Regarding claim 6, Bensimon ('862) discloses a method, wherein the step of providing said surface layer on said surface of said substrate comprises a step of

Art Unit: 4132

forming further binding sites in said surface layer (see “anchor DNA”, fig. 2, and col. 5, l. 64 – col. 6, l. 3).

14. Regarding claim 7, Bensimon ('862) discloses a method, wherein said external force comprises an attractive force provided at least partly by said further binding sites in said surface layer (col. 4, l. 56-61, and col. 5, l. 64 – col. 6, l. 3).

15. Regarding claim 8, Bensimon ('862) discloses a method, wherein said surface layer is self assembling (col. 6, l. 25-30).

16. Regarding claim 9, Bensimon ('862) discloses a method, wherein said step for providing said surface layer on said surface of said substrate comprises a step for using a Langmuir-Blodgett technique or a self organized film technology (col. 6, l. 25-30).

17. Regarding claim 10, Bensimon ('862) discloses a method, wherein the method further comprises a step for altering said predefined molecular interaction between the polymer molecule and said support (col. 3, l. 54 - col. 4, l. 10).

18. Regarding claim 11, Bensimon ('862) discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for placing said surface layer with the polymer molecule provided thereon into a liquid medium (col. 3, l. 54-61).

19. Regarding claim 12, Bensimon ('862) discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for drying said surface layer with the polymer molecule provided thereon (see “passage of meniscus”, col. 3, l. 54-61 and fig. 6). It is implicit in Bensimon ('862) that the ‘passage of the meniscus’ denotes drying of the surface layer once the meniscus of the solution passes beyond the polymer molecule.

Art Unit: 4132

20. Regarding claim 13, Bensimon ('862) discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for changing a temperature of said surface layer (see "temperature variation", col. 12, l. 6-26).

21. Regarding claim 14, Bensimon ('862) discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for applying an electric field oriented at a certain angle with respect to said surface of said support (see "electrophoresis", col. 12, l. 6-26).

22. Regarding claim 15, Bensimon ('862) discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for exciting the polymer by light (col. 2, l. 1-3, and fig. 1).

23. Regarding claim 16, Bensimon ('862) discloses a method, wherein said external force is provided by using one of the following electric fields: electrical field, magnetic field, optical field, and mechanical field, or any combinations thereof (see "passage of meniscus", col. 4, l. 6-7).

24. Regarding claim 17, Bensimon ('862) discloses a method, wherein a scanning probe microscope (SPM) is used for applying said external force (see "AFM", col. 12, l. 42-49). It is inherent that an atomic force microscope (AFM) is a type of scanning probe microscope as evidenced by Jung et al., US 5440920 (see abstract), and that atomic force microscopy applies an external force to a polymer molecule to enable precise scanning.

25. Regarding claim 18, Bensimon ('862) discloses a method, wherein the polymer molecule comprises a polynucleotide such as DNA or RNA, a polypeptide such as



Art Unit: 4132

protein, an antibody or antigen-antibody system, a polysaccharide, or a desired mixture of biomolecules (col. 3, l. 24-26).

26. Regarding claim 19, Bensimon ('862) discloses a method, wherein said surface layer comprises an inorganic polymer, an organic polymer, an organic low molecular substance, a metal, a metal oxide, a sulfide, a semiconductor, or an optical element, or any combinations thereof (col. 3, l. 8-12).

27. Regarding claim 20, Bensimon ('862) discloses a method, wherein said substrate is atomically flat (see "mica", col. 3, l. 14). It is inherent that mica is formed of atomically flat sheets of silicate material.

28. Regarding claim 21, Bensimon ('862) discloses a method, wherein said substrate comprises glass, surface oxidized silicon, gold, molybdenum sulfide, highly oriented pyrolytic graphite or mica (col. 3, l. 13-14).

29. Regarding claim 22, Bensimon ('862) discloses a method, wherein the method comprises a step for anchoring at least one end of the polymer molecule to said support (col. 3, l. 24-26).

30. Regarding claim 23, Bensimon ('862) discloses a method, wherein the method comprises a step for anchoring at least one end of the polymer molecule to be arranged to a fiber, a micro-particle, or a nano-particle (col. 3, l. 16-21).

### ***Conclusion***

Art Unit: 4132

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIRK BASS whose telephone number is (571)270-7370.

The examiner can normally be reached on Monday - Thursday 10am-4pm.

32. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MIKE LAVILLA can be reached on 5712721539. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

33. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DRB/  
Dirk R. Bass  
January 13, 2009

**/Michael La Villa/  
Michael La Villa  
Supervisory Patent Examiner, Art Unit 4132  
15 January 2009**